We claim:

1. A composition comprising

a) a ricinoleic acid component selected from the group consisting of castor oil, ricinoleic acid, castor oil estolide, ricinoleic acid estolide and combinations thereof,

b) an epoxy group-containing compound selected from the group consisting of epoxy resins, epoxidized vegetable oils and combinations thereof, and

c) a crosslinker.

2. The composition of claim 1, wherein the ricinoleic acid component is an epoxidized vegetable oil and the crosslinker is a polycarboxylic acid.

3. The composition of claim 1, further comprising an additional component selected from the group consisting of a crosslinking catalyst, a filler and combinations thereof.

4. The composition of claim 3, wherein the crosslinking catalyst is a free radical generating catalyst.

5. The composition of claim 4, wherein the crosslinking catalyst is a thermally activated free radical initiator.

6. The composition of claim 4, wherein the free radical generating catalyst. is selected from the group consisting of 2,5-dimethyl-2, 5-di (tert-butylperoxy) hexane, 1, 4-di- (2-tert-butylperoxyisopropyl) benzene, tert-butyl cumyl peroxide, di-tert-butyl peroxide, 2, 4, 4-trimethylpenty-2 hydroperoxide, diisopropylbenzene monohydroperoxide, cumyl hydroperoxide, 2, 5-dimethyl-2, 5-di (tert-butylperoxy) hexane peroxide, methyl ethyl ketone peroxide, dicumyl peroxide, dibenzoyl peroxide and combinations thereof.

7. The composition of claim 1, wherein the crosslinker is a polycarboxylic acid and the composition further comprises a polyamine,

8. The composition of claim 7, wherein the polyamine is selected from the group consisting of isophoronediamine, 1,2-diaminocyclohexane, bis-p-aminocyclohexylmethane, 1,3-BAC high reactive cycloaliphatic diamines, diethylenetriamine, 4,4'-isopropylidenediamine, 1,4-diaminobutane, triethylene glycol diamine, and combinations thereof.

9. The composition of claim 3, wherein the filler is selected from the group consisting of wood flour, limestone, titanium dioxide, kaolin clay and combinations thereof.

10. The composition of claim 3, wherein the filler comprises powdered limestone.

11. The composition of claim 3, wherein the epoxy group-containing compound selected from the group consisting of tetraglycidal diaminodiphenyl methane, diglycidyl ether of bisphenol A, epoxidized soybean oil, and combinations thereof.

12. The composition of claim 1, wherein the crosslinker is selected from the group consisting of a polyfunctional amine, a polycarboxylic acid, a polyacrylate and combinations thereof.

13. The composition of claim 12, wherein the polycarboxylic acid is selected from the group consisting of sebacic acid, citric acid and combinations thereof.

14. The composition of claim 12, wherein the polyfunctional amine is selected from the group consisting of isophoronediamine, 1,2-diaminocyclohexane, bis-p-aminocyclohexylmethane, 1,3-BAC high reactive cycloaliphatic diamines, diethylenetriamine, 4,4'-isopropylidenediamine, 1,4-diaminobutane, triethylene glycol

diamine, and combinations thereof.

15. The composition of claim 1, wherein the epoxy group-containing compound comprises a combination of an epoxy resin and an epoxidized vegetable oil.

16. The composition of claim 1, wherein the ricinoleic acid component is a ricinoleic acid estolide.

17. The composition of claim 16, wherein the ricinoleic acid component is an estolide prepared by enzyme-catalyzed polymerization.

18. The composition of claim 17, wherein the enzyme is a lipase derived from Candida Antarctica.

19. A surface covering that includes at least one component comprising the composition of claim 1.

20. The surface covering of claim 19 wherein the surface covering is a floor covering.

21. A composition comprising the reaction product of the composition of claim 1.

22. A composition comprising the reaction product of a composition comprising an additional component selected from the group consisting of a crosslinking catalyst, a filler and combinations thereof, and the composition of claim 21.

23. The composition of claim 22, wherein the additional component is a crosslinking catalyst selected from the group consisting of 2,5-dimethyl-2, 5-di (tert-butylperoxy) hexane, 1, 4-di- (2-tert-butylperoxyisopropyl) benzene, tert-butyl cumyl peroxide, di-tert-butyl peroxide, 2, 4, 4-trimethylpenty-2 hydroperoxide,

diisopropylbenzene monohydroperoxide, cumyl hydroperoxide, 2, 5-dimethyl-2, 5-di (tert-butylperoxy) hexane peroxide, methyl ethyl ketone peroxide, dicumyl peroxide, dibenzoyl peroxide and combinations thereof.

24. The composition of claim 21, wherein the crosslinker is selected from the group consisting of a polyfunctional amine, a polycarboxylic acid, a polyacrylate and combinations thereof.

25. The composition of claim 24, wherein the crosslinker is selected from the group consisting of sebacic acid, citric acid, isophoronediamine, 1,2-diaminocyclohexane, bis-p-aminocyclohexylmethane, 1,3-BAC high reactive cycloaliphatic diamines, diethylenetriamine, 4,4'-isopropylidenediamine, 1,4-diaminobutane, triethylene glycol diamine and combinations thereof.

26. The composition of claim 24, wherein the epoxy group-containing compound is epoxidized soybean oil.

27. The composition of claim 24, wherein the ricinoleic acid component is an estolide prepared by enzyme-catalyzed polymerization.

28. A floor covering that includes at least one component comprising the composition of claim 24.

29. A composition comprising the reaction product of a composition comprising

(a) the reaction product of the composition of claim 1, wherein the polycarboxylic acid selected from the group consisting of sebacic acid, citric acid and combinations thereof, and

(b) 2, 5-dimethyl-2, 5-di (tertbutylperoxy) hexane peroxide.

30. The composition of claim 29, wherein the composition comprising elements (a) and (b) further comprises a component selected from the group consisting of tri-ethylene glycol diamine, powdered limestone and combinations thereof.

31. A composition comprising the reaction product of a composition comprising

(a) the reaction product of

(i) a component selected from the group consisting of castor oil, ricinoleic acid, castor oil estolide, ricinoleic acid estolide and combinations thereof,

(ii) a polycarboxylic acid, and

(iii) an acid catalyst

(b) epoxidized vegetable oil, and

(c) a crosslinker.

32. The composition of claim 31, wherein the polycarboxylic acid is selected from the group consisting of sebacic acid, citric acid and combinations thereof.

33. The composition of claim 31, wherein the crosslinker is selected from the group consisting of a polycarboxylic acid, a polyamine, a polyacrylate and combinations thereof.

34. The composition of claim 31, wherein the reaction product comprising (a), (b) and (c), further comprises a component selected from the group consisting of a thermally activated free radical initiator, an epoxy resin, a filler and combinations thereof.

35. A composition comprising a component selected from the group consisting of thermally activated free radical initiator, filler and combinations thereof and the composition of claim 31.

36. A composition comprising

a) the reaction product of a polycarboxylic acid and an epoxidized vegetable oil, and

b) the reaction product of component selected from the group consisting of castor oil, ricinoleic acid, castor oil estolide, ricinoleic acid estolide and combinations thereof and a polycarboxylic acid.

37. A composition comprising the reaction product of a composition comprising a thermally activated free radical initiator and the composition of claim 36.

38. The composition of claim 36, further comprising a filler.

39. A penetrating polymer network comprising

a) a polyester backbone comprising esterified ricinoleic acid, wherein

i) the polyester backbone comprises a pendant moiety selected from the group consisting of an hydroxy moiety, a carboxylic acid moiety and combinations thereof, and

ii) the pendant hydroxy moiety on the polyester backbone is covalently coupled to an epoxy group on an epoxy group-containing compound comprising at least two epoxy groups, and

b) an epoxy hardener covalently crosslinked with at least two epoxy groups on the epoxy group-containing compound covalently coupled to the polyester backbone,

wherein the epoxy hardener is selected from the group consisting of diamines, polyamines, dicarboxylic acids, polycarboxylic acids, thiols, and phenols.

40. The penetrating polymer network of claim 39, further comprising crosslinks between at least two double bonds present in the ricinoleic acid backbone.

41. The penetrating polymer network of claim 39, wherein the esterified ricinoleic acid is made by enzyme-catalyzed polymerization.

42. The penetrating polymer network of claim 40, further comprising a free radical generating crosslinking catalyst.

43. The penetrating polymer network of claim 42, wherein the free radical generating crosslinking catalyst is selected from the group consisting of methyl ethyl ketone peroxide, dicumyl peroxide, di-tert-butyl peroxide, dibenzoyl peroxide and combinations thereof.

44. The penetrating polymer network of claim 39, wherein the epoxy group-containing compound is selected from the group consisting of diglycidyl ether of bisphenol A, epoxidized soybean oil and combinations thereof.

45. The penetrating polymer network of claim 39, wherein the epoxy hardener is selected from the group consisting of a polyfunctional amine, a polycarboxylic acid and combinations thereof.

46. The penetrating polymer network of claim 45, wherein the polyfunctional amine is selected from the group consisting of isophoronediamine, 1,2-diaminocyclohexane, bis-p-aminocyclohexylmethane, 1,3-BAC high reactive cycloaliphatic diamines, diethylenetriamine, 4,4'-isopropylidenediamine, 1,4-diaminobutane, triethylene glycol diamine and combinations thereof.

47. The penetrating polymer network of claim 39, further comprising a filler is selected from the group consisting of wood flour, limestone, titanium dioxide, kaolin clay and combinations thereof.

48. A decorative surface covering that includes at least one component comprising the penetrating polymer network of claim 39.

49. The decorative surface covering of claim 48, wherein surface covering is a floor covering.

50. An elastomeric polymer sheet material comprising the penetrating polymer network of claim 39.

51. A process for making a ricinoleic acid or ricinoleic acid estolide based polymer comprising

(a) mixing and heating a ricinoleic acid component selected from the group consisting of castor oil, castor oil estolide, ricinoleic acid, ricinoleic acid estolide and combinations thereof with a crosslinker and an epoxy group-containing compound selected from the group consisting of an epoxy resin, an epoxidized vegetable oil and combinations thereof to form a pre-cured material, and

(b) heating the pre-cured material under pressure.

52. The process of claim 51, wherein an additive component selected from the group consisting of a crosslinking catalyst, a filler and combinations thereof is included in the pre-cured material prior to step b.

53. The process of claim 51, wherein the crosslinker is a polycarboxylic acid and the epoxy group-containing compound is epoxidized soybean oil.

54. The process of claim 52, wherein the additive component is a crosslinking catalyst selected from thermally activated free radical initiators, the crosslinker is a polycarboxylic acid and the epoxy group-containing compound is epoxidized soybean oil, and wherein the ricinoleic acid component, the polycarboxylic acid and the epoxidized soybean oil are mixed and heated prior to adding the thermally activated free radical initiator to the mixture of the ricinoleic acid component, the polycarboxylic acid and the epoxidized soybean oil, and heating the thermally activated free radical initiator containing mixture to form the pre-cured material.

55. The process of claim 54, further comprising adding a filler concurrently with the thermally activated free radical initiator.

56. The process of claim 51, wherein the pre-cured material is heated to a temperature of between about 180°C and about 220°C.

57. The process of claim 52, wherein the crosslinking catalyst is benzoyl peroxide, and the pre-cured material is heated to a temperature between about 85°C to about 125°C.

58. The process of claim 51, wherein the crosslinker is a polycarboxylic acid and step (a) comprises

(i) reacting a composition comprising a mixture of the ricinoleic acid component and the polycarboxylic acid in the presence of acid catalyst, wherein the ricinoleic acid component is selected from the group consisting of castor oil, ricinoleic acid and combinations thereof,

(ii) adding a second polycarboxylic acid and an epoxidized vegetable oil to the reacted composition of step (i),

(iii) heating the mixture of step (ii), and

(iv) adding the additive component to the heated mixture of step (iii), wherein the additive component is a thermally activated free radical initiator.

59. The process of claim 58, further comprising adding a filler in step (iv) .

60. The process of claim 58, wherein a polyamine is added to the reaction composition of step (i) in step (ii) or is added to heated mixture of step (iii) in step (iv) .

61. The process of claim 58, wherein the polycarboxylic acid of step (i) and the second polycarboxylic acid of step (ii) are independently selected from the group consisting of sebacic acid, citric acid and combinations thereof.

62. The process of claim 51, wherein the crosslinker is a polycarboxylic acid and step (a) comprises

(i) mixing the ricinoleic acid component with the polycarboxylic acid,

(ii) heating the mixture of step (i),

(iii) adding the epoxidized vegetable oil and the thermally activated free radical initiator to the heated mixture of step (ii), and

(iv) heating the epoxidized vegetable oil and thermally activated free radical initiator containing mixture of step (iii) to form the pre-cured material.

63. The process of claim 62, wherein the additional component is added in step (iii).

64. The process of claim 62, wherein a crosslinker other than the polycarboxylic acid is added in step (i).

65. The process of claim 52, wherein the crosslinker is a polycarboxylic acid and step (a) comprises

(i) mixing the ricinoleic acid component with the polycarboxylic acid and the epoxidized vegetable oil,

(ii) heating the mixture of step (i),

(iii) adding the additive component to the heated mixture of step (ii), and

(iv) heating the mixture of step (iii) to form the pre-cured material.

66. The process of claim 51, further comprising forming the mixture into a desired final shape prior to curing.

67. The process of claim 51, further comprising partially curing the mixture, adding a filler to the partially cured mixture, and then curing the filler containing mixture.

68. The process of claim 51, wherein the ricinoleic acid component is a ricinoleic acid estolide.

69. The process of claim 68, wherein the ricinoleic acid estolide prepolymer is partially polymerized by an enzyme catalyst prior to being mixed with the other components of the mixture.

70. The process of claim 69, wherein the enzyme catalyst is lipase obtained from *Candida Antarctic* B.